

## **Appendix A**

### **Glossary of Common Terms**



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**Absorption chiller** – A refrigeration machine using heat as the power input to generate chilled water.

**Adjustable speed drive** – A means of changing the speed of a motor in a step-less manner. In the case of an AC motor, this is accomplished by varying the frequency.

**Aerator** – A device installed in a faucet or showerhead that adds air to the water flow, thereby maintaining an effective water spray while reducing overall water consumption.

**Air changes** – Replacement of the total volume of air in a room over a period of time (e.g., 6 air changes per hour).

**Ambient temperature** – The temperature of the air surrounding an object.

**Ballast** – A device used to supply the proper voltage and limit the current to operate one or more fluorescent or high-intensity discharge lamps.

**Base** – A selected period of time with consumption levels or dollar amounts, to which all future usage or costs are compared.

**Blackwater** – Water discharged from toilets, urinals, and kitchen sinks.

**BLCC** – Building Life Cycle Costing.

**Blowdown** – The discharge of water from a boiler or a cooling tower sump that contains a high proportion of total dissolved solids.

**British thermal unit (Btu)** – The amount of heat required to raise the temperature of one pound of water 1 degree Fahrenheit at or near 39.2 degrees Fahrenheit.

**Building commissioning** – A systematic process of assuring that a building facility performs in accordance with design intent and the owner's operational needs. Verification and documentation that all building facility systems perform interactively in an efficient manner and that operations and maintenance personnel are well trained.

**Building envelope** – The exterior surfaces of a building that are exposed to the weather, i.e., walls, roof, windows, doors, etc.

**Cavitation** – A condition occurring when the inlet pressure at the pump is less than the vapor pressure of the liquid being pumped, causing the liquid to vaporize into bubbles in the suction stream. The bubbles collapse on entering the pump housing with the rotating impeller, preventing the pump from effectively moving the liquid. This creates the very distinct sound of marbles being shaken in a tin can. Each pump has its own characteristic net positive suction head (NPSH) required to prevent this condition.

**Cell** – The smallest cooling tower subdivision with independent air and water flow. It is enclosed by exterior walls or partition walls. Each cell may have one or more fans and one or more distribution systems.

**Chilled Water Reset Schedule** – An automated control logic that raises or lowers the supply temperature of the chilled water leaving the chiller, in response to another variable such as outside air temperature.

**Celsius (Centigrade)** – The temperature at which the freezing point of water is 0 degrees and the boiling point is 100 degrees at sea level.

**Centrifugal fan** – A device for propelling air by centrifugal action.

**cfm** – Cubic feet per minute usually refers to the volume of air being moved through an air duct.

**Chiller** – A refrigeration machine using mechanical energy input to drive a centrifugal compressor to generate chilled water.

**Coefficient of performance** – Ratio of tons of refrigeration produced to energy required to operate equipment.

**Coefficient of utilization** – Ratio of lumens on the work surface to total lumens emitted by the lamps.

**Coils** – Coils are used to heat and cool an airstream by transferring heat from or to another medium. They can be bare-tube type or have an extended fin surface. Coils may use water, steam, refrigerant, or electricity as a source for heat transfer.

**Cold deck** – A cold air chamber forming a part of an air conditioning system.

**Combined wastewater** – A facility's total wastewater, both graywater and blackwater.

**Compressor** – A mechanical device used to compress a gas.

**Color rendering index (CRI)** – The color appearance of an object under a light source as compared to a reference source.

**Condensate** – Water obtained by changing the state of water vapor (i.e., steam or moisture in air) from a gas to a liquid usually by cooling.

**Condenser** – A heat exchanger which removes heat from vapor, changing it to its liquid state. In refrigeration systems, this is the component which rejects heat.

**Conduction** – Method of heat transfer in which heat moves through a solid.

**Convection** – Method of heat transfer in which heat moves by motion of a fluid or gas, usually air.

**Cooling tower** – A device that cools water directly by evaporation.

**Damper** – A device used to limit the volume of air passing through an air outlet, inlet, or duct.

**Degree days** – The degree day for any given day is the difference between 65 degrees and the average daily temperature. For example, if the average temperature is 50 degrees, the degree days is  $65 - 50 = 15$  degree days. When accumulated for a season, degree days measure the severity of the entire season.

**Demand load** – The maximum continuous requirement for electricity measured during a specified amount of time, usually 15 minutes.

**Demand factor** – The ratio of the maximum demand of a system to the total connected load on the system.

**Double bundle chiller** – A condenser usually in a refrigeration machine that contains two separate tube bundles allowing the option of rejecting heat to the cooling tower or to another building system requiring heat input.

**Dry bulb temperature** – The measure of the sensible temperature of air.

**Economizer cycle** – A method of operating a ventilation system to reduce refrigeration load. Whenever the outside air conditions are more favorable (lower heat content) than return air conditions, outdoor air quantity is increased.

**Efficacy** – Ratio of usable light to energy input for a lighting fixture or system (lumens per watt)

**Energy management system** – A microprocessor-based system for controlling equipment and monitoring energy and other operating parameters in a building.

**Energy requirement** – The total yearly energy used by a building to maintain the selected inside design conditions under the dynamic impact of a typical year's climate. It includes raw fossil fuel consumed in the building and all electricity used for lighting and power. Efficiencies of utilization are applied and all energy is expressed in the common unit of Btu.

**Energy utilization index** – A reference which expresses the total energy (fossil fuel and electricity) used by a building in a given period (month, year) in terms of Btu's/gross conditioned square feet.

**Enthalpy** – The total heat content of air expressed in units of Btu/pound. It is the sum of the sensible and latent heat.

**Evaporator** – A heat exchanger in which a liquid evaporates while absorbing heat.

**Evaporation** – The act of water or other liquids dissipating or becoming vapor or steam.

**Expansion valve** – A component of the refrigeration system that regulates the rate of flow of liquid refrigerant into the evaporator.

**Fan Coil Unit** – A small terminal air handling unit with a fan and coil(s) to heat and/or cool the airstream.

**Faucet aerator** – Either a device inserted into a faucet head or a type of faucet head that reduces water flow by adding air to the water stream through a series of screens and/or small holes through a disk. An aerator produces a low-flow non-splashing stream of water.

**Fill** – The portion of a cooling tower that provides a large air-water interface area for heat transfer allowing a small amount of water to evaporates into the airstream, cooling the remaining water.

**Flow restrictors** – Washer-like disks that fit inside faucet or shower heads to restrict water flow.

**Flushometer valve toilet** – Also known as a pressure assisted or pressurized tank toilet, a toilet with the flush valve attached to a pressurized water supply tank. When activated, the flush valve supplies the water to the toilet at the higher flow rate necessary to flush all of the waste through the toilet trap and into the sewer.

**Foot candle** – Illumination at a distance of one foot from a standard candle.

**Gravity flush toilet** – A toilet designed with a rubber stopper that releases stored water from the toilet's tank. Gravity flow water then fills the bowl and carries the waste out of the bowl, through the trap and into the sewer.

**Graywater** – Used water discharged by sinks, showers, bathtubs, clothes washing machines, and the like.

**Gross square feet** – The total number of square feet contained in a building envelope using the floors as area to be measured.

**Heat gain** – As applied to HVAC calculations, it is that amount of heat gained by space from all sources including people, lights, machines, sunshine, etc. The total heat gain represents the amount of heat that must be removed from a space to maintain indoor comfort conditions. This is usually expressed in Btu's per hour.

**Heat loss** – The heat loss from a building when the outdoor temperature is lower than the desired indoor temperature it represents the amount of heat that must be provided to a space to maintain indoor comfort conditions. This is usually expressed in Btu/hour.

**Heat pump** – A refrigeration machine possessing the capability of reversing the flow so that its output can be either heating or cooling. When used for heating, it extracts heat from a low temperature source.

**Heat transmission coefficient** – Any one of a number of coefficients used in the calculation of heat transmission by conduction, convection, and radiation through various materials and structures.

**Hi-pot (high potential) Testing** – Process of applying high voltage to electrical components to verify a lack of leakage current and unsafe conditions.

**Horsepower (hp)** – British unit of power, 1 hp = 746 watts or 42,408 Btu's per minute.

**Hot deck** – A hot air chamber forming part of a multi-zone or dual duct air handling unit.

**Humidity, relative** – A measurement indicating the moisture content of the air.

**IAQ** – Indoor Air Quality.

**IEQ** – Indoor Environmental Quality.

**Impeller** – The rotating part of a centrifugal pump, compressor, or fan designed to move a fluid by rotational force. It is usually made up of a disc with multiple vanes attached to it.

**Infiltration** – The process by which outdoor air leaks into a building by natural forces through cracks around doors and windows.

**Latent heat** – The quantity of heat required to effect a change in state of a substance.

**Life-cycle cost** – The cost of the equipment over its entire life including operating costs, maintenance costs, and initial cost.

**Low flow toilet** – A toilet that uses 3.5 gallons of water per flush.

**Load profile** – Time distribution of building heating, cooling, and electrical load.

**Lumen** – Unit of measurement of rate of light flow.

**Luminaire** – Light fixture designed to produce a specific effect.

**Makeup** – Water supplied to a system to replace that lost by blowdown, leakage, evaporation, etc. Air supplied to a system to provide for combustion and/or ventilation.

**Megger** – Electronic tool that generates high voltage used in testing insulation integrity.

**Modular** – System arrangement whereby the demand for energy (heating, cooling) is met by a series of units sized to meet a portion of the load.

**Notched Belt** – A belt with teeth (notches) used to mechanically link two or more rotating pulleys. The notches increase grip, help cool the belt and relieve stress as the belt bends around small diameter pulleys. This improves drive efficiency.

**Orifice plate** – Device inserted in a pipe or duct which causes a pressure drop across it. Depending on orifice size, it can be used to restrict flow or form part of a measuring device.

**ORSAT apparatus** – A device for measuring the combustion components of boiler or furnace flue gasses.

**Piggyback operation** – Arrangement of chilled water generation equipment whereby exhaust steam from a steam turbine driven centrifugal chiller is used as the heat source of an absorption chiller.

**Plenum** – A large duct used as a distributor of air from a furnace.

**Potable water** – Clean, drinkable water; also known as “white” water.

**Power factor** – Relationship between KVA and KW. The power factor is one when the KVA equals the KW.

**Pressurized tank toilet** – A toilet that uses a facility’s waterline pressure by pressurizing water held in a vessel within the tank; compressing a pocket of trapped air. The water releases at a force 500 times greater than a conventional gravity toilet.

**Pressure reducing valve** – A valve designed to reduce a facility’s water consumption by lowering supply-line pressure.

**Process Load** – A cooling or heating load not related to maintaining occupant comfort, such as file server rooms and specialized diagnostic equipment in the health-care sector. The loads may be intermittent or continuous.

**Pump Head** – The differential pressure of a fluid generated by a pump between its inlet and outlet. This pressure may be expressed in feet of water or pounds per square inch (psi).

**Radiation** – The transfer of heat from one body to another by heat waves without heating the air between them.

**Refrigerant** – A substance producing a refrigerating effect by expanding or vaporizing.

**R Value** – The resistance to heat flow of insulation.

**Seasonal efficiency** – Ratio of useful output to energy input for a piece of equipment over an entire heating or cooling season. It can be derived by integrating part load efficiencies against time.

**Sensible heat** – Heat that results in a temperature change, but no change in state.

**Siphonic jet urinal** – A urinal that automatically flushes when water, which flows continuously to its tank, reaches a specified preset level.

**Source meter** – A water meter that records the total waterflow into a facility.

**Sub meter** – A meter that record energy or water usage by a specific process, a specific part of a building, or a building within a larger facility.

**Terminal Unit** – The final piece of HVAC equipment in the distribution system capable of modifying the temperature in a conditioned space.

**Therm** – A unit of gas fuel containing 100,000 Btu’s.

**Thermography** – Process of generating visual images that represent variations in infrared radiance of surfaces and objects.

**Ton (of refrigeration)** – A means of expressing cooling capacity: 1 ton = 12,000 Btu/hour cooling (removal of heat).

**Transducers** – Electronic device that converts energy from one form to another.

**Trend Logging** – Recording system variables (e.g., temperature, volume, pressure, power) at time intervals to monitor equipment operation and help identify or diagnose problems. Logging is accomplished using portable data loggers, electrical meters, or the resident DDC system.

**Two-Way Valve** – A valve regulating flow between no flow and full flow. It can either modulate or operate as a two-position valve (open/closed) in response to an external input signal. There is no bypass as is found in a 3-way valve.



**U Value** – A coefficient expressing the thermal conductance of a composite structure in Btu's per (square foot) (hour) (degree Fahrenheit difference).

**Ultra low flow toilet** – A toilet that uses 1.6 gallons or less of water per flush.

**Variable speed drive** – See “Adjustable speed drive.”

**Variable frequency drive** – See “Adjustable speed drive.”

**V-Belt** – A belt used to mechanically link two or more rotating pulleys. The “V” shape of the belt tracks in a mating groove in the pulley (or sheave).

**Veiling reflection** – Reflection of light from a task or work surface into the viewer's eyes.

**Vapor barrier** – A moisture impervious layer designed to prevent moisture migration.

**Wet bulb temperature** – The lowest temperature attainable by evaporating water in the air without the addition or subtraction of energy.

**Xeriscaping** – The selection, placement, and care of water-conserving and low-water-demand ground covers, plants, shrubs, and trees in landscaping.